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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/670,673	09/27/2000	Michael L. Honig	12569US01	5558

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EXAMINER	
WARE, CICELY Q	

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/670,673	HONIG, MICHAEL L.	
	Examiner	Art Unit	
	Cicely Ware	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2004* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-9,11-23 and 25* is/are rejected.

7)☐ Claim(s) *5,10 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 April 2004* is/are: a)☒ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 4, 6, 7, 8, 9, 11, 12, 14, 15, 17, 18, 19, 22, 23 and 25 rejected under 35 U.S.C. 103(a) as being unpatentable over Posch (US Patent 5,724,270) in view of Honig et al. (Adaptive Reduced-Rank Residual Correlation Algorithms for DS-CDMA Interference Suppression).

(1) With regard to claim 1, Posch discloses a method of filtering successive received signal samples, a group of N successive samples forming a received sample vector of digital data having a Nx1 dimension to provide an approximate desired signal comprising: generating a set of basis vectors where each successive basis vector is a function of a given or an estimated steering vector and successively greater powers of a covariance matrix for a sequence of received sample vectors of data with the initial basis vector being from the steering vector (col. 2, lines 37-67, col. 3, lines 1-5).

However Posch does not disclose generating a reduced rank vector of digital data having a Dx1 dimension, where D is less than N, from a matrix of D basis vectors and a received sample vector of data; generating a Dx1 filter coefficient vector from the

generated basis vectors; and generating the approximate desired signal from the filter coefficients and the reduced rank vector of data.

However Honig et al. discloses generating a reduced rank vector of digital data having a Dx1 dimension, where D is less than N, from a matrix of D basis vectors and a received sample vector of data; generating a Dx1 filter coefficient vector from the generated basis vectors; and generating the approximate desired signal from the filter coefficients and the reduced rank vector of data (Pg. 1106, col. 1, lines 29-32, col. 2, lines 33-35, Pg. 1107, lines 9-13, 17-21, 27-29).

Therefore it would have been obvious to one of ordinary skill in the art to modify Posch to incorporate generating a reduced rank vector of digital data having a Dx1 dimension, where D is less than N, from a matrix of D basis vectors and a received sample vector of data; generating a Dx1 filter coefficient vector from the generated basis vectors; and generating the approximate desired signal from the filter coefficients and the reduced rank vector of data for a substantial reduction in the number of training samples needed to estimate the filter parameters (Honig et al., Pg. 1106, lines 35-38).

(2) With regard to claim 3, claim 3 inherits all the limitations of claim 1. Honig et al. further discloses wherein the reduced rank vector is generated by multiplying the Hermitian transpose of the matrix of basis vectors by the received sample vector of data (Pg. 1107, col. 2, lines 3-13).

(3) With regard to claim 4, claim 4 inherits all the limitations of claim 1. Honig et al. further discloses a method including forming a Dx1 correlation vector with correlation

scalars, each correlation scaler formed by multiplying a Hermitian transpose of the initial basis vector by i^{th} basis vector for i equal 0 through D-1 (Pg. 1107, col. 2, lines 1-45).

(4) With regard to claim 6, claim 6 inherits all the limitations of claim 1. Honig et al. further discloses generating the desired signal by multiplying a Hermitian transpose of the filter coefficient matrix by the reduced rank vector of data (Pg. 1107, col. 2, lines 1-45).

(5) With regard to claim 7, claim 7 inherits all the limitations of claim 1. Honig et al. further discloses generating D filter coefficients from a plurality of correlations between pairs of basis vectors of data (Pg. 1107, col. 2, lines 1-45).

(6) With regard to claim 8, claim 8 inherits all the limitations of claims 7 and 3.

(7) With regard to claim 9, claim 9 inherits all the limitations of claims 7 and 4.

(8) With regard to claim 11, claim 11 inherits all the limitations of claims 7 and 6.

(9) With regard to claim 12, claim 12 inherits all the limitations of claim 1. Honig et al. further discloses generating 2 D-1 correlations between pairs of basis vectors (Pg. 1108, col. 2, lines 21-55).

(10) With regard to claim 14, claim 14 inherits all the limitations of claims 12 and 3 above.

(11) With regard to claim 15, claim 15 inherits all the limitations of claims 12 and 4 above.

(12) With regard to claim 17, claim 17 inherits all the limitations of claim 12 and 6 above.

(13) With regard to claim 18, claim 18 inherits all the limitations of claim 1.

(14) With regard to claim 19, claim 19 inherits all the limitations of claim 18. Honig et al. further discloses where D is selected to be less than or equal to 8 (Pg. 1109, col. 2, lines 21-27).

(15) With regard to claim 22, claim 22 inherits all the limitations of claims 20 and 13 above.

(16) With regard to claim 23, claim 23 inherits all the limitations of claims 20 and 15 above.

(17) With regard to claim 25, claim 25 inherits all the limitations of claims 20 and 17 above.

3. Claim 2, 13, 20, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Posch (US Patent 5,724,270) in combination with Honig et al. (Adaptive Reduced-Rank Residual Correlation Algorithms for DS-CDMA Interference Suppression) as applied to claims 1, 3, 12 and 18 above, and further in view of Honig et al. (Multiuser CDMA Receivers).

With regard to claim 2, claim 2 inherits all the limitations of claim 1. Posch in combination with Honig et al. disclose all the limitations of claim 1 above.

However Posch in combination with Honig et al do not disclose where D+1 successive basis vectors are generated by multiplying an immediately preceding basis vector of data by the covariance matrix for the received sample vector

However Honig et al. discloses where D+1 successive basis vectors are

generated by multiplying an immediately preceding basis vector of data by the covariance matrix for the received sample vector (pg. 54, Fig. 4, Pg. 55, col. 1, paragraph 1, lines 22-41).

Therefore it would have been obvious to one of ordinary skill in the art to modify the inventions of Posch in combination with Honig et al to incorporate where D+1 successive basis vectors are generated by multiplying an immediately preceding basis vector of data by the covariance matrix for the received sample vector in order to utilize different signature waveforms for different users with sufficient excess bandwidth to facilitate signal separation at the receiver (Honig et al., Pg. 50, col. 2, lines 45-47).

(3) With regard to claim 13, claim 13 inherits all the limitations of claims 12 and 2.

(12) With regard to claim 20, claim 20 inherits all the limitations of claims 18. Honig et al. further discloses where D is selected to minimize an a posteriori Least Squares cost function (Pg. 54, col. 1, lines 8-15).

(13) With regard to claim 21, claim 21 inherits all the limitations of claims 20 and 3 above.

Allowable Subject Matter

4. Claims 5,10, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 703-305-8326. The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
May 22, 2004

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600